

Can we abolish the 60-year-old international consensus that connects nuclear radiation to cancer?



By Jerry M. Cuttler

From 1974 to 2000, Dr. Jerry Cuttler worked at Atomic Energy of Canada Limited to develop, engineer, and support more than 20 power reactors. He then supplied services as Cuttler & Associates. Since 1995, he has been collaborating with medical scientists and biologists in research and applications of low doses of ionizing radiation in medicine.

Our goal should be to discredit the international consensus opinion that any ionizing radiation exposure increases cancer risk. It advocates a precautionary

principle policy that constrains the exploitation of nuclear energy. This policy of social fear also blocks, totally, vital applications of low radiation doses in medical therapies for cancer, infections, inflammation, neurodegeneration, autoimmune disorders, and more. It is surely possible to disseminate the scientific information of more than 120 years of medical practice and scientific research to counter this health scare, which was created soon after President Eisenhower's Atoms for Peace speech on December 8, 1953.

Why should ANS be interested? On June 12, 2017, the American Nuclear Society identified nine Nuclear Grand Challenges that need to be resolved by 2030 to address key issues we face as a society. The first one is low-dose radiation: "Establish the scientific basis and guidelines for the health effects of low-dose radiation and replace the current linear no-threshold approach with a modern, science-backed model for nuclear radiation safety."¹

From the discovery of ionizing radiation in 1895–1896, practitioners have based treatments on dose *limits*. The radiation scare was begun by many scientists after atomic bombs were employed to end World War II. They wanted an end to any further use of them.

Also, it is likely that suppliers of coal and oil were concerned about potential competition from newly discovered nuclear energy, because soon after President Eisenhower's Atoms for Peace speech, the Rockefeller Foundation reacted.² It had begun to fund and manage the National

Academy of Sciences (NAS) in the 1950s to assess in detail multiple areas of concern related to radiation exposure from the nuclear weapons tests. On February 23, 1954, the Rockefeller Foundation wrote to Eisenhower, suggesting that the NAS conduct a study of radiation effects “with particular attention to the possible danger to the genetic heritage of man.”

The study, which was published on June 29, 1956, recommended that the linear no-threshold (LNT) dose-response model be used to estimate the risk of radiation-induced genetic mutations, rather than the threshold model.^{3,4} A threshold limit for lasting harm had been the basis for the safe “tolerance dose” of 0.2 roentgen per day, or about 0.7 Gy per year, that radiologists had used since 1925 for their protection.⁵ LNT was controversial. It was based on flawed research on fruit flies, and it was contradicted by the 10-year study of 76,626 registered pregnancies in Hiroshima and Nagasaki that showed no evidence of hereditary damage. However, the NAS disregarded this human data.²

This NAS study was followed by a study of leukemia among the atomic bomb survivors that linked radiation exposure to cancer by fitting the LNT model to the data. A review of this 1957 paper revealed that the data of Zone D (2 to 3 km from ground zero) had been combined with the data of Zone E (3 km beyond ground zero). This concealed the 1.1-Gy threshold dose for the onset of radiation-induced leukemia. The 32,700 survivors in Zone D, whose doses were below the threshold dose, had a *lower* leukemia incidence than the controls in Zone E. Since blood-forming stem cells in bone marrow are exceptionally radiation-sensitive, it is reasonable to expect the thresholds for inducing cancer in other, less sensitive cells to be higher than 1.1 Gy and the latencies for tumors to be longer than the three to 12 years for leukemia. The low incidence of leukemia in Zones A and B—only 48 cases in 10,051 survivors—for a cancer that is commonly linked to radiation, suggests that radiation is not really a significant cause of cancer.^{2,6}

The cancer study’s author was unable to convince the NAS scientists that radiation-induced cancer was linear with dose. However, he forged an intellectual compromise with an influential member of the National Committee on Radiation Protection and Measurement (NCRP), who led

the NAS pathology panel. Together, they urged the NCRP to accept their compromise. In 1959, the NCRP adopted the *precautionary principle policy*, which, in effect, meant estimating the risk of radiation-induced cancer using the LNT model. The 1960 paper stated that it was based on public fear and *lack of knowledge*, even though there had been more than 60 years of experience in the use of X-rays and nuclear radiation in medicine and thousands of publications in many journals.

The United States and every other country adopted the NCRP’s precautionary principle policy. The International Commission on Radiological Protection was reorganized in 1962 and began to publish reports on the NCRP’s new concept of *stochastic* effects of radiation—its *risk* of causing

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cancer.⁷ A broad international consensus developed around this concept. However, this principle is based on the public health philosophy of fear; it contradicts all known evolutionary biology in which organisms react to radiation damage by adapting, protecting, preventing, compensating, reconstituting, repairing, removing, and restoring. Lauriston S. Taylor, a founder and longtime president of the NCRP, stated in 1980 that studies “calculating the numbers of people who will die as a result of having been subjected to diagnostic X-ray procedures [using the LNT model] . . . are deeply immoral uses of our scientific knowledge.”⁸

It evokes Thomas Henry Huxley’s 1870 quotation: “The great tragedy of science—the slaying of a beautiful hypothesis by an ugly fact.” And there are many facts to refute the LNT hypothesis, starting with the data from the studies on thousands of the “radium girls.” In a cohort of 1,468 watch dial painters, of the 56 who had malignancies, all had systemic intakes above a *threshold* of 100 µg of radium. The cumulative dose *threshold* for the onset of bone sarcoma was found to be about 1,000 rad or 10 Gy.^{6,9} Studies on the atomic bomb survivors show a *threshold* of about 1.1 Gy for the onset of leukemia. The atomic bomb survivors showed no evidence of hereditary damage.

Perspective continues

The Chernobyl accident caused widespread post-traumatic stress disorder due to the predictions of increased cancer. Screening the thyroids of thousands of children detected naturally occurring, self-limiting occult thyroid cancer nodules. Many thyroidectomies were performed that were not medically required. Further, many additional conclusions of the 2005 Chernobyl Forum Report were contradicted by evidence presented by Dr. Zbigniew Jaworowski.¹⁰

The concerns about thyroid cancer led researchers in Sweden and in England to carry out studies on patients treated with iodine-131. The 35,074 people in the Swedish study, followed for an average of 20 years, had an average dose of 1.1 Gy. There was no statistically significant

was 1.09 percent per year, *lower* than the 1.4 percent mortality rate of unexposed Russian workers. After 30 years, the number of deaths had increased from 22 to 26, which corresponds to an even lower mortality rate of 0.82 percent per year. Of the 26 deaths, only 7 of those people died of cancers (27 percent).⁶ These facts contradict the NCRP predictions about radiation being very harmful.

The Nuclear Shipyard Workers Study showed that the high-dose workers had significantly *lower* circulatory, respiratory, and all-cause mortality than the did the unexposed workers.^{2,13} In addition, the mortality from all cancers combined was also lower in the exposed cohort—more “ugly facts.” From about 1940 to 1970, up to millions of children and thousands of U.S. Navy pilots received nasopharyngeal radium irradiation to treat adenoid inflammation and ear disorder. Follow-up studies worldwide did not confirm a definite link between these exposures and any disease.⁶

Many studies of long-term exposure have been performed on dogs, which model humans quite well. An analysis of a study on lifelong exposure to cobalt-60 radiation provided evidence of a dose-rate threshold at about 0.7 Gy per year for the onset of life-span shortening. The incidence of cancer in the exposed dogs was about the same as for the controls.¹⁴ These facts are contrary to the messages being communicated daily to the public via the ongoing fearmongering.

The false radiation scare not only blocks the provision of affordable nuclear energy, it also blocks the provision of low doses of radiation to remediate cancer metastases, inflammations, infections, autoimmune diseases, and neurodegenerative Alzheimer’s disease and Parkinson’s disease.⁶ For this grand challenge, ANS has to persuade the U.S. government to “establish the scientific basis and guidelines for the health effects of low-dose radiation and replace the current linear no-threshold approach with a modern, science-backed model for nuclear radiation safety.” ☒

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increase in thyroid cancers in adults and children, who were not thought to have had cancer before their treatment with I-131.¹¹ In fact, after addressing the confounders, an opposite effect was observed—a *decrease in thyroid cancer incidence, as compared with the nonirradiated adult population*.¹⁰ In the British study, 7,417 patients had been treated with I-131 for hyperthyroidism. They were followed for an average of 10 years. The mean total-body radiation dose was about 54 mGy; the mean dose to the thyroid was about 300 Gy. The incidence of all cancers was a deficit of 17 percent. Most surprising was the 40 percent cancer deficit in the nearby respiratory and intrathoracic organs.¹²

Of the 237 Chernobyl emergency workers who were hospitalized, 134 were heavily irradiated, 28 died, and 106 recovered from doses in the 1–6-Gy range. In the subsequent 19 years, 22 of them died. Surprisingly, their mortality rate

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